USER MANUAL

Warmup®

The world's best-selling electric floor heating brand

Type ETO2
Controller for ice and snow melting

English

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GREEN COMFORT
Maximum comfort with low energy consumption

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GLOSSARY

Zone 1, 2:	Independent heating zones in which ice and snow can be melted.
Encoder button:	Button which can be turned or pressed to easily configure the settings.
ETOG-55:	Ground sensor for detecting moisture and temperature.
ETOR-55:	Gutter sensor for detecting moisture.
ETF-744/99:	Outdoor sensor for detecting temperature.
Y/Δ:	Advanced 2-stage control of electric heating systems.
Afterrun:	The heat provided by the system, for a specified length of time, after the moisture/temperature signal has been eliminated by a heating cycle.

INTRODUCTION

Type ETO2 is an electronic controller for fully automatic, economical ice and snow melting on outdoor areas and in gutters. Ice forms due to a combination of low temperature and moisture. ETO2 detects both temperature and moisture and the heating system will only be activated if a possibility of snow or ice is indicated by both parameters.

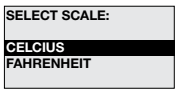
An easily operated encoder button and backlit graphic display ensure quick and easy configuration and simple indication of temperature, status, etc.

ETO2 is suitable for controlling electric heating cables in 1 or 2 zones. It also features advanced two-stage output control for economic operation.

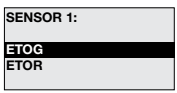
In hydronic mode, the supply sensor maintains the required supply water temperature while the system is active. When heat is demanded, the circulation pump is activated and the valve is opened 20% for 1 minute to let the system stabilise. The main pump is then activated.

When there is no need for melting, the system activates the circulation pump for 1 minute every 15 minutes to check whether the return water temperature has dropped below the required “idle temp.” If this is the case, the system fully activates to increase the return water temperature to the required level.

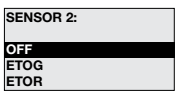
STARTUP



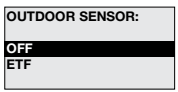
When ETO2 is switched on for the first time, Celsius or Fahrenheit must be selected. Turn the encoder button until the required temperature scale is highlighted. Then OK the selection by pressing the encoder button.



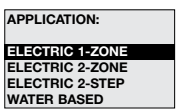
SENSOR 1 is shown on the display, allowing the type of sensor connected for input 1 to be selected:
ETOG : Ground sensor
ETOR : Gutter sensor + outdoor sensor
Then OK the selection by pressing the encoder button.



SENSOR 2 is then shown on the display, allowing the type of sensor connected for input 2 to be selected. If none sensor is connected for input 2, OFF must be selected.



Select if outdoor sensor ETF is connected terminals 31-32.
If none sensor ETF is connected, OFF must be selected. Press encoder button for OK.



Select the application type by turning the encoder button and pressing OK.
ELECTRIC 1-ZONE : 1 zone electric heating control/simple waterbased.
ELECTRIC 2-ZONE : 2 zones individual electrical heating control/simple waterbased.
ELECTRIC 2-STEP : Advanced 2-stage electric heating control (Y/Δ) for 1 zone.
WATERBASED : 1 zone waterbased heating control with supply water control.

Select the appropriate option and press OK. The system is now set up, and will begin operating fully automatically, in accordance with the pre-configured standard program, see FACTORY SETTINGS. Alternative settings can also be made, see SETTINGS.

Status and afterheat data for zones 1 and 2 are now shown on the display.

OPERATION

ETO2 is equipped with an easily operated encoder button (turn and press) and a display which describes the current situation. The display is backlit and is illuminated by pressing the encoder button (OK). The illumination is automatically switched off after 30 seconds.

Press the encoder button and the main menu will be shown on the display.
Turn the button to scroll through the options. Not all the options are shown on the display at once, but they can be accessed by turning the encoder button.
Press OK to select a highlighted option.

MAIN MENU

ZONE 1	OFF
ZONE 2	OFF
SENSOR 1	##.#°C
SENSOR 2	##.#°C
MOIST 1	NO
MOIST 2	NO
OUT. TEMP	##.#°C
SUPPLY W.	##.#°C
RETURN W.	##.#°C
ALARM	NO
SHOW INFO	
SETUP	
RESTART	
EXIT	

DISPLAY TEXTS

ZONE 1 OFF	Heating zone 1 active (ON) or inactive (OFF)
ZONE 2 OFF	Heating zone 2 active (ON) or inactive (OFF)
SENSOR 1 ##.#°C	Sensor 1 (heated sensor) core temperature. Applies only when ETOG sensor is connected. NOTE: Not ambient temperature!
SENSOR 2 ##.#°C	Sensor 2 (heated sensor) core temperature. Applies only when ETOG sensor is connected. NOTE: Not ambient temperature!
MOIST 1 NO	Sensor 1 moisture status. YES / NO / Blank. Blank will be shown if temperature is above Set Temp or the system is in Afterrun mode.
MOIST 2 NO	Sensor 2 moisture status. YES / NO / Blank. Blank will be shown if temperature is above Set Temp or the system is in Afterrun mode.
OUT TEMP ##.#°C	Ambient outdoor temperature. Applies only when ETF sensor is connected.
SUPPLY W. ##.#°C	Supply water temperature, only waterbased application
RETURN W. ##.#°C	Return water temperature, only waterbased application

ALARM NO	Fault message, fault type will be displayed. Red LED on front of unit will flash.

APPLICATION INFO

SHOW INFO

APP: E. 1-ZONE	Application type: electric or water-based heating
SW VERSION 1.00	Software version
SENSOR 1 ETOG	Sensor type, sensor 1
SENSOR 2 OFF	Sensor type, sensor 2
SENSOR ETF OFF	ETF sensor connected
EXIT	Return to main menu

SETTINGS

Please note that incorrect sensor setup may lead to poor or lacking ice and snow melting.

Press OK and a submenu will be shown on the display.

Select the parameter to be set and press OK.

SETUP

FORCE HEAT OFF Manual start of forced heat. Press OK and select ON to start Forced heat. ETO2 controller will heat in the pre-programmed afterrun time, see AFTERRUN 1 and 2.

SELECT SCALE C Whether temperature is to be displayed in Celsius (C) or Fahrenheit (F) can be selected here. Select the required scale and press OK. Press OK to return to the SETUP menu.

SET TEMP 1 3.0C Set temperature for Zone 1: The temperature at which the ice and snow melting system will become active can be set here. The temperature setting can be adjusted from +50 / -20°C (122 / -4°F). Set the required temperature and press OK.

SET TEMP 2 3.0C Set temperature for Zone 2: The temperature at which the ice and snow melting system will become active can be set here. The temperature setting can be adjusted from +50 / -20°C (122 / -4°F). Set the required temperature and press OK.

OFF TEMP 1 OFF The lowest operating temperature for Zone 1 can be set here. Below this temperature, the system will enter standby mode. The adjustment range goes down to -20°C/OFF (-3.9°F/OFF). OFF = no limit. To change the minimum cut-off temperature, press OK, turn the encoder button to the desired value and confirm with OK.

OFF TEMP 2 OFF The lowest operating temperature for Zone 2 can be set here. The adjustment range goes down to -20°C/OFF (-3.9°F/OFF). OFF = no limit. To change the minimum cut-off temperature, press OK, turn the encoder button to the desired value and confirm with OK.

AFTERRUN 1 2:00 Afterrun time Zone 1 : An afterheat duration of between 0 and 18 hours can be set here. The system will continue to provide heat for the specified time after the moisture/temperature signal has been eliminated by a heating cycle. Use the encoder button to set the required afterrun time and press OK.

AFTERRUN 2 2:00	Afterrun time Zone 2 : An afterheat duration of between 0 and 18 hours can be set here. Use the encoder button to set the required afterrun time and press OK.
OFFSET T1 0.0C	Zone 1 temperature can be calibrated here. With ETOG-55 sensor, the temperature shown on the ETO2 display is always the core temperature of the sensor. For calibration, please see page 13.
OFFSET T2 0.0C	Zone 2 temperature can be calibrated here. With ETOG-55 sensor, the temperature shown on the ETO2 display is always the core temperature of the sensor. For calibration, please see page 13.
OFFSET OUT. 0.0C	Outdoor temperature can be calibrated here. The temperature, recorded by the ETF outdoor sensor, can be adjusted so that the exact temperature is displayed on ETO2. Measure the temperature beside the sensor using a thermometer. Adjust the necessary offset using the encoder button. Press OK.
MIN WATER 5.0C	The minimum return water temperature can be set here. Set the required minimum temperature and press OK. This menu option is only available when water-based heating is used.
MAX WATER 55.0C	The maximum supply water temperature can be set here. Set the required maximum temperature and press OK. This menu option is only available when water-based heating is used.

SENSOR HEAT AUTO

In auto mode, sensor heating is switched off during periods when snow melting is active. In special options or extreme cold weather the sensor heat can be selected on continuously. Select ON and press OK.

MOIST CTRL ON

The moist control on sensor can be switched off here. The termostat will only control snow and ice melting after the set temperature, see SET TEMP. Select OFF for switching off the moist control and press OK.

Note that energy consumption/costs will rise with lacking moisture control.

SENSITIVITY NORM

Sensor sensitivity can be adjusted in 5 steps: MIN - LOW - NORM - HIGH - MAX. To change sensitivity, press OK, turn the encoder button to the desired setting and confirm with OK.

FACTORY RESET

All ETO2 factory settings can be restored here. Selecting this option deletes all customised settings.

REINSTALL

REINSTALL
PASSWORD **XXXX**

Whether setup failure in startup menu, or new hardware connection has been done, The primare setup must be changed in STARTUP menu. Select PASSWORD and turn the encoder button to the factory code (1202) The controller will then return to the startup menu, see STARTUP.

EXIT

Select this option and press OK to return to the main menu.

RESTART
When changing the settings or require a new process start, the ETO2 can be restarted in this menu.

RESTART	Restart operation. Keeping your current settings. The ETO2 will go to the initial status display.

OFFSET CALIBRATION
If it is necessary to calibrate the temperature measured by the ETOG sensor, please follow the steps below:

1. Disconnect the sensor from terminals 11 and 12 (sensor heating) of the ETO2.
2. Wait a few hours until the sensor has acquired the same temperature as the ground.
3. Measure the real ground/sensor temperature and compare it with the temperature shown on the ETO2 display.
4. Program the offset for the sensor concerned to match the difference between the two temperatures (displayed/real). Adjust the necessary offset using the encoder button. Press OK.
5. Reconnect the sensor to terminals 11 and 12 of the ETO2.

NOTE: With ETOG-55 sensor, the temperature shown on the ETO2 display is always the core temperature of the sensor.

FACTORY SETTINGS

SETUP	FACTORY SETTINGS	OWN SETTINGS
Application	Electric	
Zone 1	ETOG	
Zone 2	OFF	
Select scale	Celsius	
Afterrun time Zone 1	2.00 hours	
Afterrun time Zone 2	2.00 hours	
Temp. offset Zone 1	0.0°C / 0.0°F	
Temp. offset Zone 2	0.0°C / 0.0°F	
Temp. offset ETF	0.0°C / 0.0°F	
Temperature setpoint Zones 1+2	3.0°C / 37.4°F	
OFF temperature Zones 1+2	OFF	
Sensor heating Zones 1+2	AUTO	
Moisture control Zones 1+2	ON	
Sensitivity Zones 1+2	NORM	
Min. water temperature	5°C / 41°F	
Max. water temperature	55°C / 131°F	

TROUBLESHOOTING

By errors in the snow melting system, it is recommendable to check the setup of the ETO2. Activate the menu by pressing the adjustment knob, press SHOW INFO and readout the programmed application. By errors in the setup, activate REINSTALL with factory code 1202.
Check that all connections are placed correctly, and that cables are fastened in the clamps.
For more information on FAQ, see our website www.ojelectronics.com / support / FAQ - Snowmelting.

Ice/snow does not melt

- **Does the display show HEAT ON in zone 1 / 2?**

  YES:
  - o Wait 1-2 hours.
  - o Check under the snow, if the snow is beginning to melt the system is OK.
  - o Check heating cables for defects, bad connections, incorrect connections.
  - o It is too cold for snow melting (power/m2) or undersized heating cables/ water heating system.

- **Does the display show HEAT ON in zone 1 / 2?**

  NO:
  - o The temperature is higher than SET TEMP. Adjust SET TEMP to higher temperature.
  - o The snow around the ground sensor is melting/drifting snow has exposed the sensor. AFTERRUN time must be increased. Alternatively, FORCED HEAT can be activated.
  - o Igloo effect around the sensor. The ground sensor has melted an insulated hollow under the snow. Activate FORCED HEAT or, alternatively, set MOIST SENSOR to OFF.
  - o The temperature is lower than the OFF TEMP setting. Depending on dimensioning, the system has a lower temperature limit, at which the system can melt the snow. Try melting the snow with FORCE HEAT, before OFF TEMP is changed.

The heat does not shut off after ice/snow melting

- o Afterrun time is too long – reduce AFTERRUN time and activate RESTART in the menu.
- o Moisture detection in the ETOG/ETOR sensor is turned off – set MOIST CTRL to ON in the menu.

If the ALARM button flashes red, one of the following errors has occurred. This can be displayed under the menu: ALARM.

"RETURN TEMP LOW" - Water temperature on return pipe is too low.

"SUPPLY TEMP HIGH" - Water temperature on supply pipe is too high.

"RETURN SENSOR" - Return sensor defective.

"SUPPLY SENSOR" - Supply sensor defective.

"TEMP SENSOR 1" - Temperature sensor in ground or roof sensor 1 defective.

"TEMP SENSOR 2" - Temperature sensor in ground or roof sensor 1 defective.

"OUTDOOR SENSOR" - Outdoor sensor defective.

"SENSOR HEATER" - Short circuit of heating element in ground or roof sensor.

"FROST PROTECT" - Active frost protection due to low return temperature (waterbased systems only)

Fig. 1 *ETOG-55 Installation*

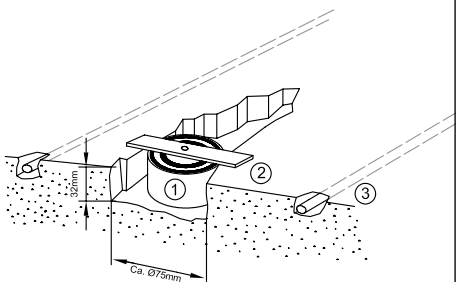


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Fig. 2 *ETOR-55 Installation*

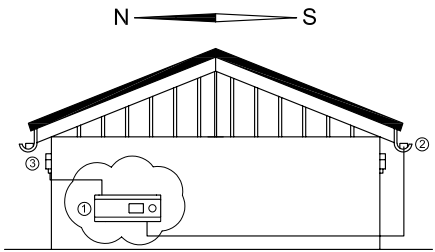

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Fig. 3 Electric 1-zone with ETOG-55 sensor

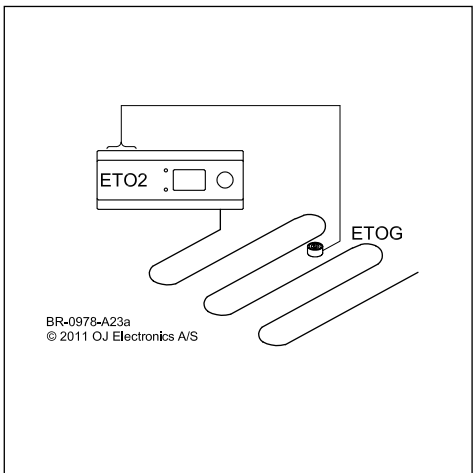


Fig. 4 Electric 1-zone with ETOR-55 / ETF

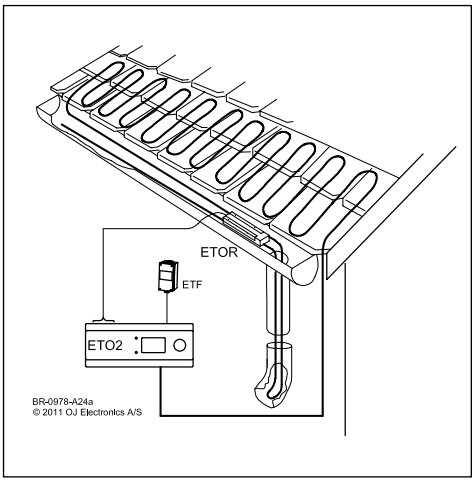


Fig. 5 *Electric 2-zone with ETOG, ETOR and ETF*

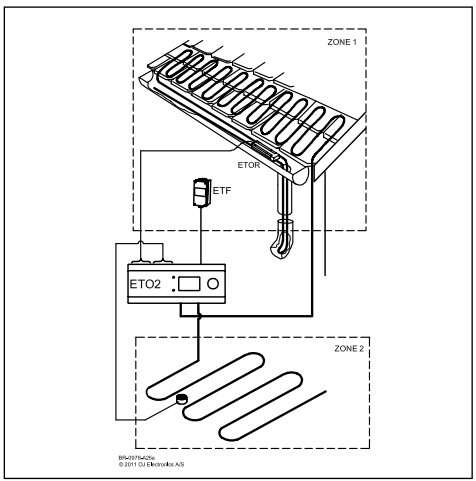


Fig. 6 *ETOG-55 connections*

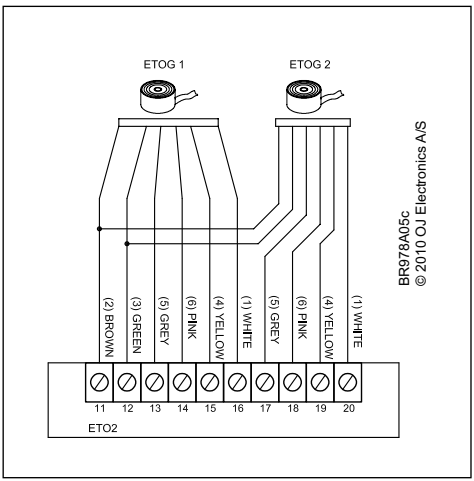


Fig. 7 ETOR-55 connections

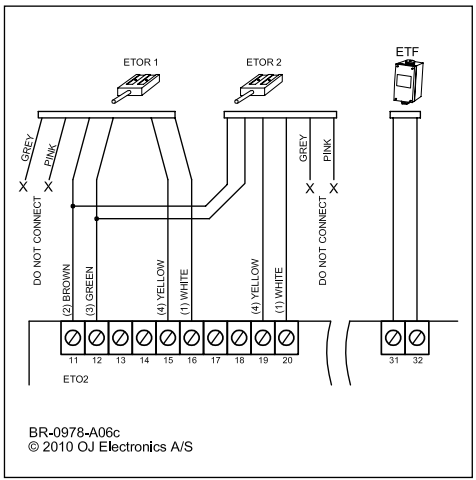


Fig. 8 Electric heating cable connections

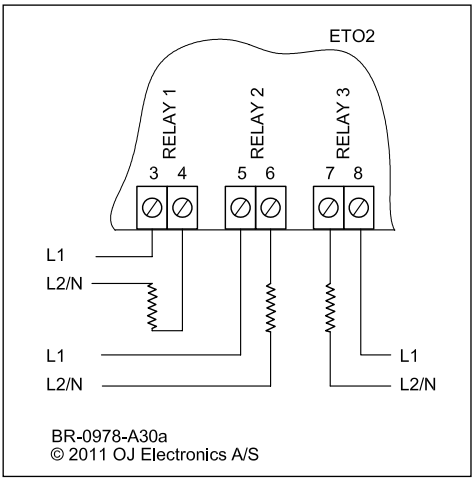


Fig. 9 *Advanced 2-step with ETOG-55. 1/3 power on heating cables in afterrun.*

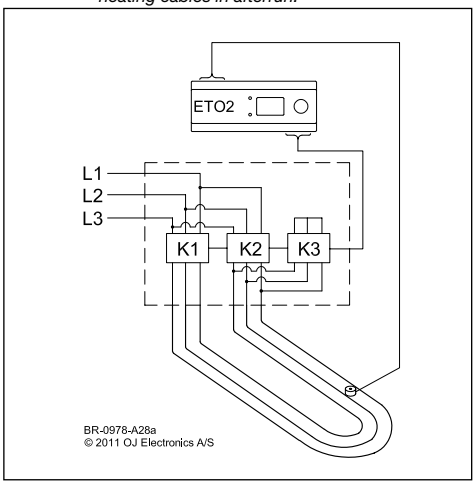


Fig. 10 *Advanced 2-step connections. 1/3 power on heating cables in afterrun.*

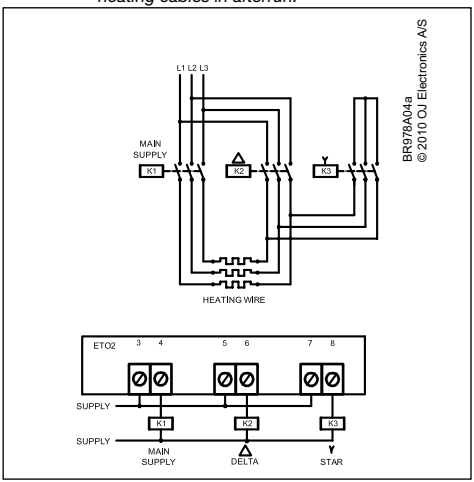


Fig. 11 Hydronic heating with mixing valve

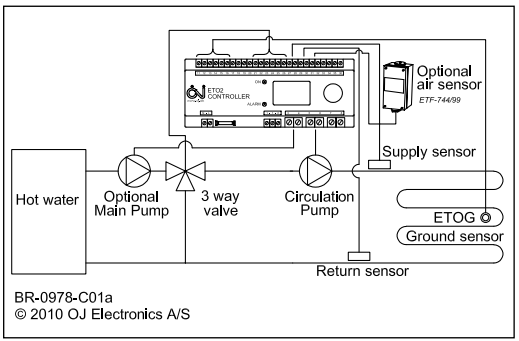


Fig. 12 Hydronic, simple application

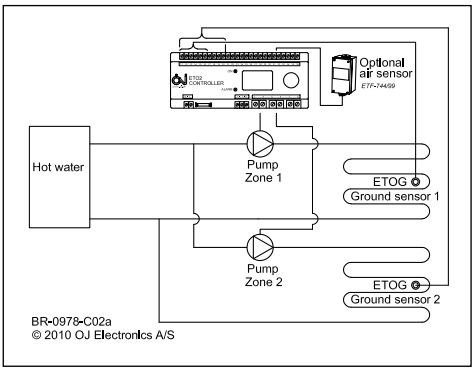


Fig. 13 Hydronic mixing valve connection

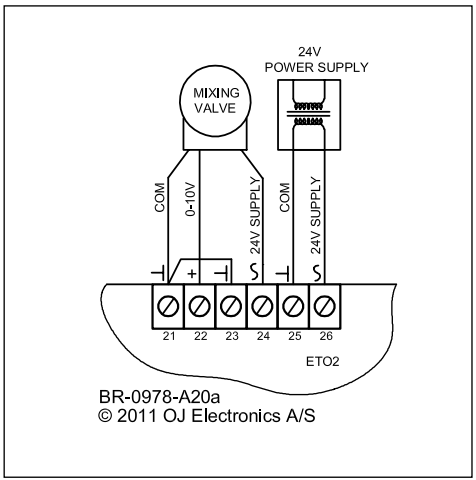


Fig. 14 Hydronic pump connection

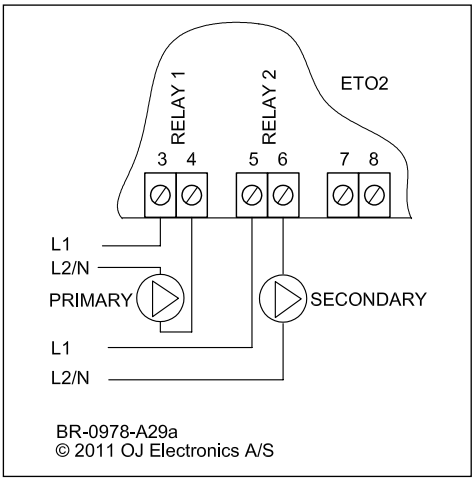


Fig. 15 Connection of Stand by & forced heat

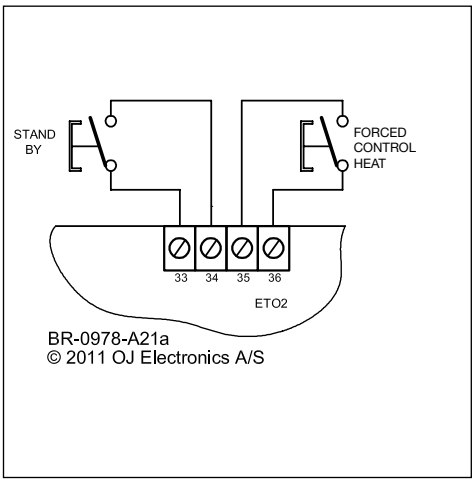
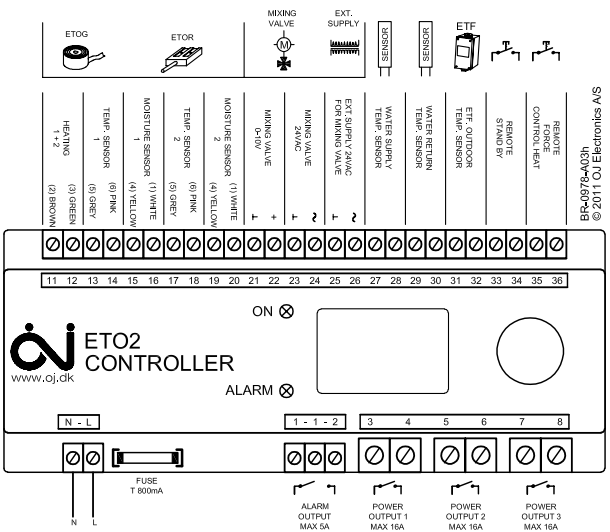


Fig. 16


ETOG
ETOR
MIXING VALVE
EXT. SUPPLY
SENSOR
SENSOR
ETF
HEATING 1+2
TEMP. SENSOR 1
MOISTURE SENSOR 1
TEMP. SENSOR 2
MOISTURE SENSOR 2
MIXING VALVE 0-10V
MIXING VALVE 24VAC
EXT. SUPPLY 24VAC FOR MIXING VALVE
WATER SUPPLY TEMP. SENSOR
WATER RETURN TEMP. SENSOR
ETF. OUTDOOR TEMP. SENSOR
REMOTE STAND BY
REMOTE FORCE CONTROL HEAT
(2) BROWN
(3) GREEN
(5) GREY
(6) PINK
(4) YELLOW
(1) WHITE
(6) PINK
(5) GREY
(4) YELLOW
(1) WHITE
0-10V
+
24VAC
24VAC
24VAC
11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36
ON
ETO2
CONTROLLER
www.oj.dk
ALARM
N - L
1 - 1 - 2
3 4 5 6 7 8
FUSE
T 800mA
N
L
ALARM OUTPUT MAX 5A
POWER OUTPUT 1 MAX 16A
ZONE 1
POWER OUTPUT 2 MAX 16A
ZONE 2
POWER OUTPUT 3 MAX 16A
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